

**Notice of Allowability**

Application No.

10/512,037

Examiner

Leo Boutsikaris

Applicant(s)

MUKAWA, HIROSHI

Art Unit

2872

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to application filed on 10/20/04.
2. ☒ The allowed claim(s) is/are 1-38.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 10/20/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

**LEONIDAS BOUTSIKARIS**  
**PRIMARY EXAMINER**

Leo Boutsikaris, Ph.D., Esq.  
Primary Patent Examiner, AU 2872  
6/21/07

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Allowable Subject Matter***

Claims 1-38 are allowed.

Claims 1-38 are allowable over the prior art of record for at least the reason that even though the prior art discloses image display devices, wherein light is transmitted through a diffractive optical element based on the Bragg condition satisfied by the angle of incidence and subsequently said light is reflected from a reflective holographic optical element to be incident again onto the diffractive optical element, or wherein light is transmitted through a diffractive optical element and subsequently said light is reflected from a reflective holographic optical element to exit the display system, or wherein light is reflected from a diffractive optical element based on the Bragg condition satisfied by the angle of incidence and subsequently said light is reflected from a reflective holographic optical element to be incident again onto the diffractive optical element, the prior art fails to teach or reasonably suggest, regarding claims 1-19, an image display device comprising a transmission type diffraction optical element for diffracting exit lights from the image display element, wherein the transmission type diffraction optical element diffracts the reflected lights from the reflection type optical element with a diffraction

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efficiency lower than a diffraction efficiency for the exit lights from the image display element, and regarding claims 20-38, an image display device comprising a transmission type diffraction optical element for diffracting exit lights from the image display element, wherein the transmission type diffraction optical element diffracts the reflected lights from the reflection type optical element with a diffraction efficiency higher than a diffraction efficiency for the exit lights from the image display element, as set forth by the claimed combination.

Takeyama (US 2002/0060850, Fig. 8) and Fairchild (US 4,688,879, Fig. 6) disclose an image display device, wherein light is transmitted through a diffractive optical element, is reflected from a reflective member, and transmitted back to and through the diffractive element. However, in the above systems, transmission of light through the diffractive element is based on the incidence angle (e.g., satisfaction of Bragg condition), not on the polarization state of the light as it is the case in the claimed system.

Takeyama (US 6,636,356, Fig. 2) and Roberts (US 5,396,349, Fig. 2) disclose an image display device, wherein light is transmitted through a diffractive optical element, is reflected from a reflective member, and transmitted towards the exit, not back to and through the diffractive element, as it is the case in the claimed system.

Amanai (US 2004/0109208, Fig. 1) and Takeyama (US 2003/0086135, Fig. 1) disclose an image display device, wherein light is reflected from a diffractive optical element, is reflected again from a second reflective member, and transmitted towards the exit.

David (US 7,205,960, Fig. 7b) discloses an image display device, wherein light is transmitted through a first diffractive optical element, is reflected from a reflective member, and transmitted back to and through a second diffractive element.

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Finally, it is noted that Suzuki (US 5,999,282, Fig. 1) discloses an image display device, wherein light is transmitted through a diffractive element, is reflected from a reflective element back and through the diffractive element, before it exits the device, wherein the transmission of light through the diffractive optical element depends on the polarization state of the light. However, in the above device, the reflective element (i.e., 11) is the image display element itself, and the light incident onto the diffractive element 3 is simply a read light, not exit light from the image display element.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is 571-272-2308. The examiner can normally be reached on M-F, 10-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

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like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leo Boutsikaris, Ph.D., Esq.  
Primary Patent Examiner, AU 2872  
June 21, 2007

  
**LEONIDAS BOUTSIKARIS**  
**PRIMARY EXAMINER**